

**AMENDED SET OF CLAIMS**

1-86. (Cancelled)

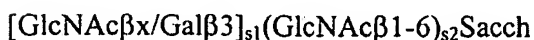
87. (Previously Presented) A pharmaceutical composition comprising a substance binding to a human tumor specific oligosaccharide sequence containing a terminal protein linked GlcNAc $\beta$ -structure or a terminal protein linked GlcNAc $\beta$ -glycan-structure for the treatment of a human cancer.

88. (Previously Presented) The pharmaceutical composition according to claim 87, wherein said human cancer is a human tumor and said human tumor specific oligosaccharide sequence is expressed on the cell surface or tissue surface of said human tumor.

89. (Previously Presented) The pharmaceutical composition according to claim 87, wherein said substance is a human antibody, humanized antibody, or glycosyltransferase enzyme.

90. (Previously Presented) The pharmaceutical composition according to claim 88, wherein said human tumor is diagnosed to express elevatedly said human tumor specific oligosaccharide sequence when compared to patient's normal tissue.

91. (Previously Presented) The pharmaceutical composition according to claim 87, wherein said oligosaccharide sequence has the sequence according to Formula



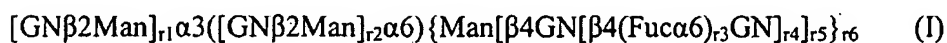
wherein x is 3, when Sacch is GalNAc; or

x is 2, when Sacch is Man; and wherein

s1 and s2 are independently 0 or 1 with the proviso that there is at least one terminal GlcNAc; the structure is branched, when both s1 and s2 are 1; Sacch is GalNAc with the provision that it

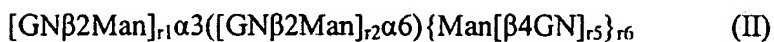
is not  $\alpha 6$ -linked to another GalNAc; Sacch is GlcNAc $\beta$  with the proviso that s1 and s2 is 0 and said GlcNAc $\beta$  is linked to a protein or peptide; [GlcNAc $\beta$ x/Gal $\beta$ 3] means that terminal residue is either GlcNAc $\beta$ x or Gal $\beta$ 3.

92. (Previously Presented) The pharmaceutical composition according to claim 87, wherein said substance binding to said oligosaccharide sequence is specific to one or several of the terminal oligosaccharide sequences of a N-glycan type structure according to Formula



wherein r1, r2, r3, r4, r5, and r6 are either 0 or 1 with the proviso that at least r1 is 1 or r2 is 1; GN is GlcNAc, with the proviso that when both r1 and r2 are 1, one GN $\beta$ Man can be further elongated with one or several other monosaccharide residues, and one GN $\beta$ 2Man can be truncated to Man, and Man $\alpha$ 6 residue and/or Man $\alpha$ 3 residue(s) can be further substituted by GN $\beta$ 6 or GN $\beta$ 4, and Man $\beta$ 4 can be further substituted by GN $\beta$ 4.

93. (Previously Presented) The pharmaceutical composition according to claim 92, wherein said substance binding to said oligosaccharide sequence is specific to one or several of the terminal oligosaccharide sequences of a N-glycan type structure according to Formula

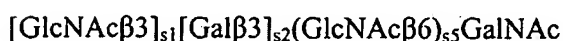


wherein r1, r2, r5, and r6 are either 0 or 1, with the proviso that at least r1 is 1 or r2 is 1; GN is GlcNAc, with the proviso that when both r1 and r2 are 1, one GN $\beta$ Man can be further elongated with one or several other monosaccharide residues, and one GN $\beta$ 2Man can be truncated to Man, and Man $\alpha$ 6 residue and/or Man $\alpha$ 3 residue can be further substituted by GN $\beta$ 6 or GN $\beta$ 4, and Man $\beta$ 4 can be further substituted by GN $\beta$ 4.

94. (Previously Presented) The pharmaceutical composition according to claim 92, wherein said oligosaccharide sequence is

GlcNAc $\beta$ 2Man, GlcNAc $\beta$ 2Man $\alpha$ 3(GlcNAc $\beta$ 2Man $\alpha$ 6)Man,  
 GlcNAc $\beta$ 2Man $\alpha$ 3(GlcNAc $\beta$ 2Man $\alpha$ 6)Man $\beta$ 4GlcNAc,  
 GlcNAc $\beta$ 2Man $\alpha$ 3(GlcNAc $\beta$ 2Man $\alpha$ 6)Man $\beta$ 4GlcNAc $\beta$ 4GlcNAc,  
 GlcNAc $\beta$ 2Man $\alpha$ 3(GlcNAc $\beta$ 2Man $\alpha$ 6)Man $\beta$ 4GlcNAc $\beta$ 4(Fuca $\alpha$ 6)GlcNAc,  
 GlcNAc $\beta$ 2Man $\alpha$ 3(Man $\alpha$ 6)Man, GlcNAc $\beta$ 2Man $\alpha$ 3(Man $\alpha$ 6)Man $\beta$ 4GlcNAc,  
 GlcNAc $\beta$ 2Man $\alpha$ 3(Man $\alpha$ 6)Man $\beta$ 4GlcNAc $\beta$ 4GlcNAc,  
 GlcNAc $\beta$ 2Man $\alpha$ 3(Man $\alpha$ 6)Man $\beta$ 4GlcNAc $\beta$ 4(Fuca $\alpha$ 6)GlcNAc,  
 Man  $\alpha$  3(GlcNAc $\beta$ 2Man $\alpha$ 6)Man, Man $\alpha$ 3(GlcNAc $\beta$ 2Man $\alpha$ 6)Man $\beta$ 4GlcNAc,  
 Man  $\alpha$  3(GlcNAc $\beta$ 2Man $\alpha$ 6)Man $\beta$ 4GlcNAc $\beta$ 4GlcNAc,  
 Man  $\alpha$  3(GlcNAc $\beta$ 2Man $\alpha$ 6)Man $\beta$ 4GlcNAc $\beta$ 4(Fuca $\alpha$ 6)GlcNAc, GlcNAc $\beta$ 2Man $\alpha$ 3Man,  
 GlcNAc $\beta$ 2Man $\alpha$ 3Man $\beta$ 4GlcNAc, GlcNAc $\beta$ 2Man $\alpha$ 3Man $\beta$ 4GlcNAc $\beta$ 4GlcNAc, GlcNAc $\beta$ 2Man  
 $\alpha$  3Man $\beta$ 4GlcNAc $\beta$ 4(Fuca $\alpha$ 6)GlcNAc, GlcNAc $\beta$ 2Man $\alpha$ 6Man,  
 GlcNAc $\beta$ 2Man $\alpha$ 6Man $\beta$ 4GlcNAc, GlcNAc $\beta$ 2Man $\alpha$ 6Man $\beta$ 4GlcNAc $\beta$ 4GlcNAc, or  
 GlcNAc $\beta$ 2Man $\alpha$ 6Man $\beta$ 4GlcNAc $\beta$ 4(Fuca $\alpha$ 6)GlcNAc

95. (Previously Presented) The pharmaceutical composition according to claim 91, wherein said substance binding to said oligosaccharide sequence is specific to one or several of the terminal oligosaccharide sequences of an O-glycan type structure according to Formula



wherein s1, s2 and s5 are independently 0 or 1, so that the oligosaccharide sequence comprises at least one nonreducing end terminal GlcNAc $\beta$ -residue.

96. (Previously Presented) The pharmaceutical composition according to claim 95, wherein said oligosaccharide sequence is protein linked GlcNAc or a derivative thereof.

97. (Previously Presented) The pharmaceutical composition according to claim 95, wherein said oligosaccharide sequence is

GlcNAc $\beta$ 3Gal $\beta$ 3(Gal $\beta$ 4GlcNAc $\beta$ 6)GalNAc, GlcNAc $\beta$ 3Gal $\beta$ 3(GlcNAc $\beta$ 6)GalNAc, GlcNAc $\beta$ 3Gal $\beta$ 3GalNAc, Gal $\beta$ 3(GlcNAc $\beta$ 6)GalNAc, GlcNAc $\beta$ 3(GlcNAc $\beta$ 6)GalNAc, GlcNAc $\beta$ 6GalNAc, or GlcNAc $\beta$ 3GalNAc

98. (Previously Presented) The pharmaceutical composition according to claim 87 further comprising a substance binding to one or several of the following terminal oligosaccharide sequences:

GlcNAc $\beta$ 3Gal, GlcNAc $\beta$ 3Gal $\beta$ 4GlcNAc, GlcNAc $\beta$ 6Gal, GlcNAc $\beta$ 6Gal $\beta$ 4GlcNAc  
GlcNAc $\beta$ 3(GlcNAc $\beta$ 6)Gal, and GlcNAc $\beta$ 3(GlcNAc $\beta$ 6)Gal $\beta$ 4GlcNAc

said composition being for the treatment of lung, larynx, colon, gastric or ovarian cancer.

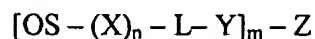
99. (Previously Presented) The pharmaceutical composition according to claim 87, wherein said oligosaccharide sequence is linked by an unnatural glycosidic linkage to other monosaccharide or oligosaccharide structures.

100. (Previously Presented) The pharmaceutical composition according to claim 87, wherein said substance binding to said oligosaccharide sequence is an aptamer, a peptide or a protein.

101. (Previously Presented) The pharmaceutical composition according to claim 100, wherein said protein is an antibody, a lectin, or a fragment thereof.

102. (Previously Presented) The pharmaceutical composition according to claim 100, wherein said protein is an enzyme recognizing the terminal GlcNAc-structures.

103. (Previously Presented) The pharmaceutical composition according to claim 87 comprising a polyvalent conjugate of said oligosaccharide sequence wherein position C1 of the reducing end terminal of the oligosaccharide sequence (OS) comprising the tumor specific terminal sequence of the invention is linked (–L–) to an oligovalent or a polyvalent carrier (Z), via a spacer group (Y), forming the following structure



where integer m have values  $m > 1$  and n is independently 0 or 1; L can be oxygen, nitrogen, sulfur or a carbon atom; X can be lactosyl-, galactosyl-, poly-N-acetyl-lactosaminyl, or part of an O-glycan or an N-glycan oligosaccharide sequence, Y is a spacer group, a terminal conjugate or a linkage to Z.

104. (Previously Presented) The pharmaceutical composition according to claim 87 comprising a pharmaceutically acceptable carrier and/or an adjuvant.

105. (Previously Presented) Use of a substance binding to a human tumor specific oligosaccharide sequence containing a terminal protein linked GlcNAc $\beta$ -structure or a terminal protein linked GlcNAc $\beta$ -glycan-structure for the manufacture of a medicament for the treatment of human cancer.

106. (Previously Presented) A method for diagnosing cancer or tumor in a biological sample taken from a human patient, the method comprising determining the presence in said sample of an oligosaccharide sequence which comprises a tumor specific terminal protein linked GlcNAc $\beta$ -structure or a terminal protein linked GlcNAc $\beta$ -glycan-structure.

107. (Previously Presented) The method according to claim 106 wherein the determination comprises

(a) contacting said biological sample with a substance binding to said oligosaccharide sequence, and

determining the presence of a combination of said substance and said sample, the presence of said combination being an indication of cancer present in said sample, or

(b) releasing the oligosaccharide structures of said biological sample by enzymatic or chemical methods to form a fraction containing free oligosaccharide structures from said sample, and

determining the presence of said oligosaccharide sequence in said fraction, the presence of said oligosaccharide sequence in said fraction being an indication of cancer present in said sample.

108. (Previously Presented) The method according to claim 106, wherein said oligosaccharide sequence is a terminal oligosaccharide sequence as defined in claim 91.

109. (Previously Presented) The method according to claim 106, wherein said cancer is a tumor.

110. (Previously Presented) The method according to claim 106, wherein a cancer or tumor type is determined.

111. (Previously Presented) The method according to claim 106, wherein normal glycosylation of the tissue containing the cancer is determined.

112. (Previously Presented) The method according to claim 106, wherein the glycosylations are determined on the surface of cancer or normal tissue

113. (Previously Presented) Diagnostic agent comprising a substance binding to a human tumor specific oligosaccharide sequence containing a terminal protein linked GlcNAc $\beta$ -structure

or a terminal protein linked GlcNAc $\beta$ -glycan-structure for the diagnosis of human cancer or cancer type.

114. (Previously Presented) Antigenic substance comprising a terminal protein linked GlcNAc $\beta$ -structure or a terminal protein linked GlcNAc $\beta$ -glycan-structure in a chemically or biochemically synthesized polyvalent form.

115. (Previously Presented) Use of the antigenic substance according to claim 114 or analogs or derivatives thereof to produce polyclonal or monoclonal antibodies.

116. (Previously Presented) Use of the antigenic substance according to claim 114 or analogs or derivatives thereof for the purification of antibodies from human serum.

117. (Previously Presented) Use of the antigenic substance according to claim 114 or analogs or derivatives thereof for the detection and/or quantitation of antibodies.

118. (Previously Presented) A cancer vaccine comprising oligosaccharide sequences containing a terminal protein linked GlcNAc $\beta$ -structure or a terminal protein linked GlcNAc $\beta$ -glycan-structure or analogs or derivatives thereof.

119. (Previously Presented) The cancer vaccine according to claim 118 comprising a pharmaceutically acceptable carrier and/or an adjuvant.

120. (Previously Presented) A substance binding to a terminal protein linked GlcNAc $\beta$ -structure or a terminal protein linked GlcNAc $\beta$ -glycan-structure for the treatment of a human cancer, wherein said substance is an aptamer, human natural or humanized antibody or peptide.

121. (Previously Presented) A method for identifying cancer or tumor specific therapeutics or diagnostic agents comprising the steps of contacting a compound with a terminal

protein linked GlcNAc $\beta$ -structure or a terminal protein linked GlcNAc $\beta$ -glycan-structure and determining binding to said oligosaccharide sequence by said compound.

122. (Previously Presented) A human anti-GlcNAc antibody obtainable by:  
passing human serum sample through a column containing immobilized terminal GlcNAc $\beta$  epitopes;  
washing the column;  
eluting the column with a buffer containing high concentration of GlcNAc;  
and collecting the antibody.

123. (Previously Presented) A functional food or food additive containing antibodies recognizing a terminal protein linked GlcNAc $\beta$ -structure or a terminal protein linked GlcNAc $\beta$ -glycan-structure for the treatment of human cancer or tumor.

124. (Previously Presented) A functional food according to claim 123, wherein said antibody is produced in milk or in hen eggs.

125. (Previously Presented) The antibody according to claim 122, wherein said antibody recognizes oligosaccharide sequence GlcNAc $\beta$ 6GalNAc $\alpha$ -O-CH<sub>2</sub>-R, GlcNAc $\beta$ 6(Gal $\beta$ 3)GalNAc $\alpha$ -O-CH<sub>2</sub>-R, GlcNAc $\beta$ 2Man or GlcNAc $\beta$ -O-CH<sub>2</sub>-R or GlcNAc $\beta$ 3GalNAc $\alpha$ -O-CH<sub>2</sub>

126. (Previously Presented) Method of treatment or diagnosis of cancer or tumor comprising transferring a modified monosaccharide derivative to cancer cells or tumor by a glycosyl transferase or a transglycosylate enzyme.

127. (Previously Presented) The method according to claim 126 wherein said modified monosaccharide derivative is a terminal protein linked GlcNAc $\beta$ -structure or a terminal protein linked GlcNAc $\beta$ -glycan-structure.



128. (Previously Presented) The method according to claim 126 wherein said modified monosaccharide derivative is according to the formula

UDP-GalN[-S]-D,

wherein

S is an optional spacer group

D is derivatizing group including molecular labels such as for example biotin or a fluorescent molecule including, or a toxic agent, prodrug or prodrug releasing substance.

129. (Previously Presented) The method according to claim 12 wherein the modified monosaccharide is UDP-GalN-spacer-biotin or UDP- N-(6-biotinamidohexanoyl)galactosamine.

130. (Previously Presented) The method according to claim 126 wherein the modified monosaccharide is transferred by a galactosyltransferase which is engineered to transfer effectively 2-modified monosaccharides or a natural GalNAc/GlcNAc-transferase with similar specificity with the said modified galactosyltransferase from animals.

131. (Previously Presented) The method according to claim 126 wherein said modified monosaccharide derivative is transferred to cell or tissue.

132. (Previously Presented) A composition comprising an enzyme substrate, capable of being transferred specifically to a surface of a pathogenic entity or malignant cell or tissue by a transferring enzyme making a covalent linkage between said enzyme substrate and an acceptor structure of said surface for use as a medicine.

133. (Previously Presented) The composition according to claim 132, wherein said enzyme substrate is conjugated to an immunologically active substance and/or a toxic substance

134. (Previously Presented) The composition according to claim 132, wherein said enzyme substrate is a carbohydrate substance capable of being transferred specifically to the surface of a pathogenic entity or malignant cell or tissue by the transferring enzyme.

135. (Previously Presented) The composition according to claim 132, wherein said transferring enzyme is a glycosyl transferase or a transglycosylate enzyme.

136. (New) The composition according to claim 132, wherein said enzyme substrate is a 2-modified monosaccharide residue.

137. (New) The composition according to claim 132, wherein said enzyme substrate is according to the Formula UDP-GalN[-S-]-D, wherein S is an optional spacer group, D is a derivatizing group including molecular labels such as biotin, a fluorescent molecule, a toxic agent, prodrug or prodrug releasing substance.

138. (New) The composition according to claim 132, wherein said enzyme substrate is transferred by a galactosyltransferase which is engineered to transfer effectively 2-modified monosaccharides or by a natural GalNAc/GlcNAc-transferase with similar specificity with said modified galactosyltransferase from animals.